PLANETARY NEBULAE-ISM INTERACTION (THEORY)

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We will review the interaction of planetary nebulae with the interstellar medium. Planetary nebula (PN) is the end stage of the evolution of intermediate mass stars. The star ejects its envelope and its hot core is ionizing the envelope that is visible as a PN with the stellar core detectable as the central star. The central stars are expected to have random velocities of the order of 40 km s^{-1} with respect to the interstellar medium (ISM). The PN shell is compressed first in the direction of the stellar motion. This produces a dipole asymmetry in the surface brightness of the nebula. In later stages of the evolution the shell is stripped away from the central star. The hydrodynamical processes ocurring in the interaction depend on the density of the ISM. In denser environments the interaction is isothermal and produces a thin shell, while in globular clusters, where the ISM density is low the interaction zone is adiabatic, a hot wide zone is formed infront of the dense PN shell and Rayleigh-Taylor instability is expected to occur. The thin shell PNs also have instabilities. Thermal instability is expected in thin shell PNs where the shell oscillates and changes in width and temperature. By looking at morphologies of near by PNs we can determine the density of the ISM, and the hydrodynamical processes taking place there.